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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JANNE J. KALLIO, TERO RANTALA, MARKKU RAUTIOLA,
PEKKA RISSANEN, KARI TUOVINEN, JAN PARKKINEN,
ALEXANDER ESSER, and PHILIP WESBY

Appeal 2008-1445
Application 10/070,411
Technology Center 2600

Decided: August 13, 2008

Before JOHN C. MARTIN, LEE E. BARRETT, and ROBERT E. NAPPI,
Administrative Patent Judges.

MARTIN*, Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1-10, 13-28, and 30 under 35 U.S.C. § 103(a).[1] No claims have been allowed.

We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

A. Appellants' invention

Appellants' invention relates to setting an operating frequency in a network, which can be a wireless telecommunications network such as a cellular radio network (Specification 1:2-3[2]).

Appellants' Figure 1 is reproduced below.

[1] Claim 29, which was finally rejected under 35 U.S.C. § 112 (Final Action 2), was canceled by an Amendment filed with the Brief and approved for entry by the Examiner in the July 30, 2007, Advisory Action.

[2] All references herein to the Specification are to the Specification as filed.

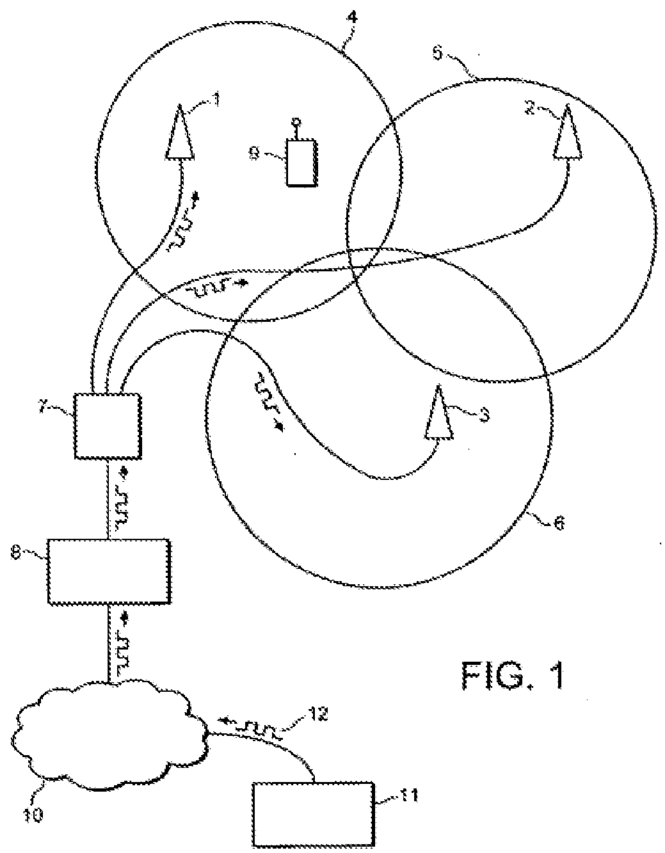

FIG. 1

Figure 1 shows schematically the configuration of a typical wireless cellular telecommunications network (Specification 1:4-5).

The network shown in Figure 1 includes base-stations 1, 2, and 3, each of which has a radio transceiver capable of transmitting radio signals to and receiving radio signals from the area of associated cells 4, 5, and 6 (*id.* at 1:6-8). By means of these signals the base-stations can communicate with a terminal 9, which may be a mobile station (MS) in the associated cell and which also includes a radio transceiver (*id.* at 1:8-10). Each base station is connected via a base station controller (BSC) 7 to a mobile switching centre

(MSC) 8, which is linked in turn to the public telephone network (PSTN) 10 (*id*. at 1:10-12).

In networks that operate according to the GSM (Global System for Mobile communications) standard, base stations must maintain a relative frequency accuracy of 5×10^{-8} on the air interface between them and mobile stations (*id*. at 1:18-20). While this accuracy can be achieved by providing a highly accurate clock at each base station, clocks of the required accuracy would generally be too expensive for this approach to be economical (*id*. at 1:20-23).

In commercial networks the normal solution is to implement a single central highly accurate reference clock (11 in figure 1) for the network (*id*. at 1:24-25). A clock signal from this clock is then conveyed as a pulse train (12 in Fig. 1) along the national telephone backbone, and then along the GSM infrastructure (via the MSC and the BSC) to each base station (*id*. at 1:25 to 2:1). This method has a number of drawbacks, one of which is that a failure in the network carrying the pulses will result in a loss of synchronization (*id*. at 2:13-16). Another drawback is that if part of the transmission chain to the base station runs across a non-clocked network, there may be very significant jitter in the pulse train received at the base station (*id*. at 2:17-19).

Appellants' Figure 3 is reproduced below.

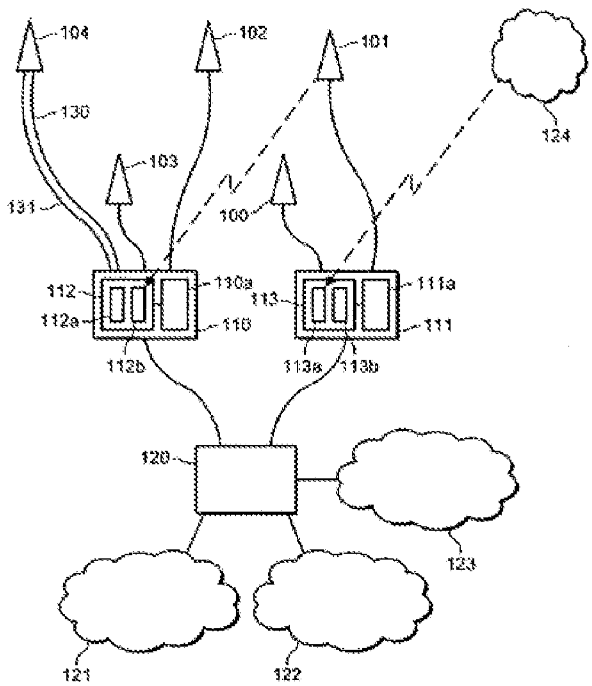

FIG. 3

Figure 3 shows schematically one example of the possible architectures of an IP-network-based cellular architecture in accordance with Appellants' invention (*id.* at 8:12-13).

The system depicted in Figure 3 includes sets or clusters of base stations 100-104 under the control of respective IMC (intranet mobile cluster) units 110, 111 (*id.* at 8:14-15). The IMC units are linked to a gateway unit (GWU) 120 through which the network as shown can be connected to an external public telephone network, a cellular network, and an IP network 123 (*id.* at 8:15-20). IMCs 110 and 111 contain synchronization units 112 and 113, respectively, each comprising a receiver

(112a, 113a), an analysis unit (112b, 113b), and a frequency setting unit (110a, 111a) for setting the frequencies of base stations 100-104 (*id.* at 8:30 to 9:3). The reference cluster, which includes IMC 111 and base stations 100 and 101, can be set by a highly accurate reference clock or, as illustrated, one or more clusters can set their frequencies by reference to signals received from an external radio telephone network 124 (*id.* at 9:3-6). Figure 3 shows receiver 113a in BSC 111 receiving a signal from an overlapping cellular network 124 for synchronizing base stations 100 and 101, and shows receiver 112a in IMC 110 receiving a signal from base station 101 for synchronizing base stations 102-104 (*id.* at 9:6-9).

B. The claims

The independent claims are claims 1, 17, 20, 22-24, 27, and 30. Claim 1 reads:

> 1. A frequency setting unit for a radio telecommunications network wherein base stations transmit at an accurately set frequency derived from a reference signal, the frequency setting unit comprising:
>
> a radio receiver for receiving signals at a first frequency from a first base station located in a first radio telecommunication network;
>
> an analysis apparatus for analysing the received signals to determine the first frequency; and
>
> a frequency setting apparatus responsive to the analysis apparatus and coupled to a second base station transmitting at a second frequency, located in a second radio telecommunication

network, for adjusting the second frequency with the aim of establishing a desired relationship between the second frequency and the first frequency.

Br. 11, Claims App.

C. The references and rejections

The Examiner relies on the following references:

Gass et al. (Gass)	US 4,774,704	Sep. 27, 1988
Toda et al. (Toda)	US 5,448,570	Sep. 5, 1995
Matsuno	US 5,613,211	Mar. 18, 1997
Lu et al. (Lu)	US 5,761,195	Jun. 2, 1998
Bauchot et al. (Bauchot)	US 6,141,336	Oct. 31, 2000
Soliman	US 6,671,291 B1	Dec. 30, 2003 (filed Jul. 21, 1999)

Claims 1-5, 7, 8, 10, 14-17, 22-25, 27, 28, and 30 stand rejected under 35 U.S.C. § 103(a) for obviousness over Soliman in view of Bauchot (Answer 5-6[3]).

Claims 6 and 9 stand rejected under § 103(a) for obviousness over Soliman in view of Bauchot and Gass (*id*. at 7).

Claim 13 stands rejected under § 103(a) for obviousness over Soliman in view of Bauchot and Toda (*id*.).

[3] References to the Answer are to the Examiner's Answer mailed June 8, 2007.

Claims 18 and 26 stand rejected under § 103(a) for obviousness over Soliman in view of Bauchot and Matsuno (*id.* at 8).

Claims 19 and 20 stand rejected under § 103(a) for obviousness over Soliman in view of Bauchot and Lu (*id.*).

Claim 21 stands rejected under § 103(a) for obviousness over Soliman in view of Bauchot, Lu, and Matsuno (*id.* at 9).

THE ISSUE

The issue is whether Appellants have shown reversible error by the Examiner in maintaining the rejection. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)). Appellants argue that the Examiner has failed to provide a rationale for combining the teachings of Soliman and Bauchot.

ANALYSIS

A. Principles of law

"[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). A rejection under 35 U.S.C. § 103(a) must be based on the following factual determinations:

(1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) any objective indicia of non-obviousness. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed. Cir. 2006) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966)).

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (quoting *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1739 (2007)). Discussing the obviousness of claimed combinations of elements of prior art, *KSR* explains:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* [*v. AG Pro, Inc.,* 425 U.S. 273 (1976)] and *Anderson's-Black Rock*[*, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740. If the claimed subject matter "involve[s] more than the simple substitution of one known element for another or the mere

application of a known technique to a piece of prior art ready for the improvement," *id.*,

> it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

Id. at 1740-41. "To facilitate review, this analysis should be made explicit." *Id.* at 1741. That is, "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). *See also PharmaStem Therapeutics Inc. v. ViaCell Inc.*, 491 F3d 1342, 1360 (Fed. Cir. 2007) (proponent of obviousness based on combination of references must show "that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, and would have had a reasonable expectation of success in doing so.") (citations omitted).

The motivation for combining reference teachings is not limited to the problem the patentee was trying to solve: "[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *In re ICON Health and Fitness Inc.*, 496 F.3d 1374, 1380 (Fed. Cir. 2007) (quoting *KSR*, 127 S. Ct. at 1742).

The motivation to combine or modify reference teachings can be based on common knowledge or common sense rather coming from the references themselves. "[T]he [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 127 S. Ct. at 1741.

Furthermore, a reference may be understood by the artisan to be suggesting a solution to a problem that the reference does not discuss. *See KSR*, 127 S. Ct. at 1742 ("The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem. . . . Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. . . . A person of ordinary skill is also a person of ordinary creativity, not an automaton.").

B. The merits of the Examiner's rejection of claim 1

Soliman discloses a method and apparatus for sequentially synchronized timing and frequency generation in a communication network (Soliman, col. 1, ll. 9-13).

Soliman notes that the majority of IS-95 and Code Division Multiple Access (CDMA) deployments operate on GPS (Global Positioning System)

time in order to gain a universal time reference for synchronization and in order to gain the benefits which follow from synchronization (*id.*, col. 1, ll. 22-26). However, an increasing number of network operators find dependence on the GPS undesirable, and the need to make a GPS measurement at each base station adds increased cost and additional time consumption to the wireless network (*id.*, col. 1, ll. 26-30).

Figure 1 of Soliman is reproduced below.

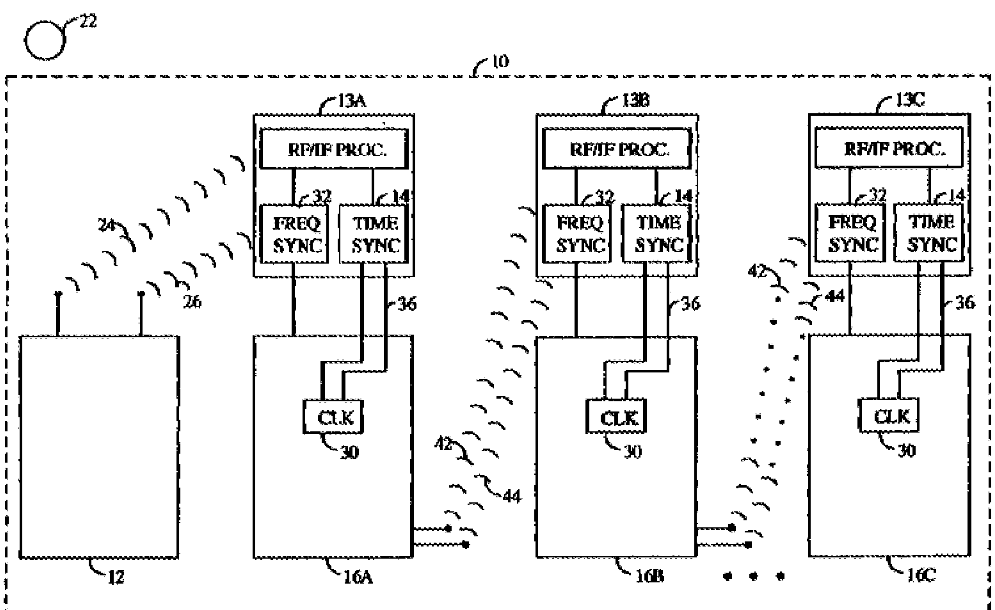

FIG. 1

Figure 1 is a block diagram illustrating a communication network 10 that includes a sequential timing and frequency synchronization system in accordance with Soliman's invention (*id.*, col. 3, ll. 58-61).

The timing/frequency synchronization system shown in Figure 1 includes a first parent station 12 and also includes secondary child stations

16A-16C having respective time/frequency transfer units 13A-13C (*id.*, col. 3, ll. 61-66; col. 7, l. 49).[4] First parent station 12 and child stations 16A-C may, for example, represent base stations in a wireless access system such as a CDMA wireless access (*id.*, col. 3, l. 66 to col. 4, l. 2).

First parent station 12, which maintains reasonably accurate time and frequency values to which the communication network is to be synchronized (*id.*, col. 4, ll. 27-31), transmits a pilot signal 24 and SYNC channel message 26 to first child station 16A (*id.*, col. 4, ll. 36-38). The SYNC channel message represents system time value, which "may be generated at the first parent station **12**, or may be received at the first parent station from a remote source **22**" (*id.*, col. 4, ll. 31-33), such as a GPS time source or a standard time source (*id.*, col. 4, ll. 33-35).

Pilot signal 24 has greater relevance to the claimed invention than does the SYNC channel message. Pilot signal 24 is transmitted at a first frequency (e.g., 10 MHz) (*id.*, col. 2, ll. 39-46) and used to synchronize the first child station to the parent station (*id.*, col. 2, ll. 46-50). Once the frequency of the first child base station has been synchronized as described above, the first child base station begins transmitting the translated pilot signal to a further child base station, thereby causing the first child base station to become a further (second) parent base station, and so on until all of

[4] The Specification uses lower case versions of the alphanumeric reference numerals that appear in the drawings (*see*, *e.g.*, col. 4, l. 40).

the base stations are synchronized in frequency (*id.*, col. 2, ll. 50-62). In a preferred embodiment, the pilot signals and pilot channels used for this aspect of the invention correspond to the pilot signals and channels defined in the IS-95A standard (*id.*, col. 2, ll. 62-65).

Soliman's Figure 2 is reproduced below.

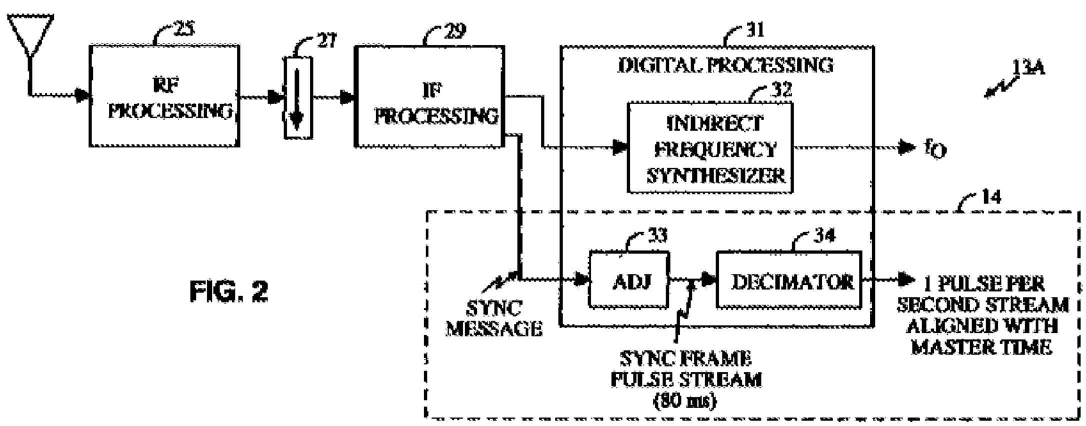

FIG. 2

Figure 2 is a block diagram illustrating components in an exemplary time/frequency transfer unit for synchronizing the absolute system time and frequency of a child base station to that of a parent base station (*id.*, col. 3, ll. 27-31).

Pilot signal 24 and SYNC message 26 are received by RF processing circuitry 25, downconverted by downconverter 27, and further processed by IF processing circuitry 29 (*id.*, col. 4, ll. 63-67). The indirect frequency synthesizer circuit 32 downconverts the center frequency of the pilot signal 26 sent from parent station 12 to a common reference center frequency (f_{master}) (*id.*, col. 7, ll. 1-4). After the center frequency of the pilot signal has been translated to the correct system frequency reference, the first child

station 16a becomes a second parent station 16a (for purposes of synchronizing frequency through network 10) because station 16a is now synchronized to the reference center frequency (*id.*, col. 7, ll. 8-14). Second parent station 16a may then begin transmitting a pilot signal 44 having a center frequency aligned with the reference frequency to a second time/frequency transfer unit 13b coupled to a further child station 16b (*id.*, col. 7, ll. 14-19).

The Examiner found that Soliman satisfies all of the limitations of claim 1 except that "Soliman does not specifically disclose that the second BTS [*sic*, base station] is located in a second radio telecommunication network" (Answer 5). Appellants appear to agree with this finding. *See* Br. 5 ("The Office acknowledges that Soliman fails to disclose or suggest a second base station transmitting at a second frequency, located in a second radio telecommunications network, as recited in claim 1, and relies on Bauchot for this teaching."). Although the Examiner did not explain how the remaining claim language is being read on Soliman, it would appear that the Examiner is reading the recited first base station on, for example, parent station 12. The time/frequency transfer unit 13A in child base station 16A includes a radio receiver, analysis apparatus, and frequency setting apparatus (see Fig. 2) for adjusting the frequency of clock 30 in the base station in response to signals received from parent station 12. However, parent station 12 and child station 16A are part of the same radio telecommunication

network rather than located in different radio telecommunication networks, as required by the claim.

For a teaching of synchronizing different networks, the Examiner relies on Bauchot, which discloses a delay-oriented traffic scheduling method for the control of such communication between an Asynchronous Transfer Mode (ATM) network and a synchronous transfer mode network (Bauchot, col. 1, ll. 10-14). In the "Background of the Invention" Bauchot notes that "[b]y marrying these two technologies, wireless ATM networks provide ATM benefits to users working with portable terminals, supporting multimedia applications for mobile users" (*id.*, col. 1, ll. 50-52). "But the wireless and ATM technologies significantly differ on several important transmission characteristics" (*id.*, col. 1, ll. 54-5), which are described at column 1, line 56 to column 2, line 2. Bauchot further explains that

> [t]he best solution is described in the European patent application 96 480047.8 which relates to a MAC protocol for wireless radio frequency access for a plurality of ATM mobile terminals to an ATM access point. This protocol is based on a time division structure in which time is slotted, and time slots are grouped into variable length time frames consisting of downlink time slots and uplink time slots. The variable length time frames consist[] of three periods (DOWN, UP__RESERVED, UP__CONTENTION). . . . The allocation of the time slots in the DOWN and UP__RESERVED periods is performed by the Access Point, and depends on the service class and QoS parameters of each established ATM connection between the Mobile Terminals and any ATM station according

> to different priority levels derived from the ATM contract parameters.

Id., col. 2, ll. 27-47. However,

> such a system does not take into account the cell delay tolerance depending on the arrival time of the cells. In other words, this system takes only the priority to each connection into account based on its service class, but not the delay constraints of the individual connections in the order of slot allocation per connection.

Id., col. 2, ll. 47-52.

Bauchot's digital communication system comprises: (1) a first network based on an asynchronous transfer mode and comprising at least one asynchronous terminal; (2) a second network based on a synchronous transfer mode and comprising a plurality of synchronous terminals; and (3) at least a base station having a transceiver for carrying out the exchange of data cells consistently communicating data from the asynchronous terminal to at least one of the plurality of synchronous terminals and data cells from one of the plurality of synchronous terminals to at least one asynchronous terminal (*id.*, col. 2, l. 61 to col. 3, l. 4). Furthermore, the base station defines a sequence of time frames during which data is exchanged, with each time frame being divided into a down period for contention-free downlink transmission, an up period for contention-free uplink transmission, and a contention period for contention-based uplink transmission (*id.*, col. 3, ll. 4-9). Finally, Bauchot's method for scheduling the contents of each time frame comprises the following steps:

> a) allocating slots to the data cells to be exchanged during a connection between one of the synchronous and one of the asynchronous terminals, with said slots being the closest possible in time of a deadline for the connection determined as being the time after which the required quality of service of the connection is not met,
>
> b) building the down period by using the cell trains which have been formed for each connection during step a),
>
> c) building the up period by using the cell trains which have been formed for each connection during step a), and
>
> d) providing a predetermined number of time slots for the contention period.

Id., col. 3, ll. 9-24.

The Examiner concluded that "Bauchot discloses wherein the second base station is connected to another telecommunications network (see col. 2, line 61 - col. 3, line 10), thereby permitting to communicate between [sic] the stations of different networks" and that "[t]herefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to add this teaching to the Soliman apparatus for being able to adjust one network to cooperate with the other network" (Answer 5-6). More particularly, the Examiner explained that

> Soliman is directed to synchronizing time and frequency in a communication network (see col. l, lines 9-13) and Bauchot is directed to synchronize timing between different communication networks (see col. 1, lines 9-14); since both references are directed to same problem of synchronization and analogous it would be obvious to one of the ordinary skill in the art at the time of invention to combine both teachings.

Answer 9-10. We agree with Appellants (Reply Br. 2[5]) that because Bauchot relates to synchronizing the transmission of data packets between two networks rather than synchronizing frequencies used in the two networks, the artisan would not have been motivated to combine the teachings of Bauchot and Soliman in the manner proposed by the Examiner.

We also agree with Appellants that Examiner is incorrect to state that "the idea of providing the delay [in Bauchot] is to match the time slot (synchronizing) of the second network, thereby it is synchronizing the time slot between the two different networks (see col. 2, line 61- col. 3, line 24; col. 2, lines 27-52)" (Answer 10). As correctly noted by Appellants,

> the transfer of data cells between the asynchronous and synchronous networks in Bauchot is not based on matching time slots between different networks, i.e. synchronization, but instead scheduling is based on the quality of service for each connection. *See e.g*. Bauchot column 5, lines 56-58 (the scheduler gives a priority to each connection based on its service class).

Reply Br. 3.

As an additional argument for motivation, the Examiner (Answer 11) relies on the mention of "handoff reliability" in following passage in Soliman:

[5] References to the Reply Brief are to the Reply Brief filed August 8, 2007.

(Continued on next page.)

> In a wireless access system, the synchronization of time and frequency of transmissions are of paramount importance. Transmissions that are synchronized and share a known time and frequency reference provide improved system acquisition, simplified mobile station searching, improved handoff reliability, improved handset standby time, and facilitated location and position searching.

Soliman, col. 1, ll. 15-21. Citing this passage, the Examiner stated that one of ordinary skill in the art would have looked "in the Bauchot reference in order to accomplish a handoff between networks" (Answer 11). We agree with Appellants that this reliance is misplaced because

> Bauchot makes no mention or suggestion of performing handoffs, and instead only addresses establishing communication between a terminal in an asynchronous network with a terminal in a synchronous network. Bauchot does not disclose or suggest a terminal traveling between different networks, and thus requiring a handoff to take place in order for the terminal to continue communicating.

Reply Br. 3.

Because, for the foregoing reasons, the Examiner has failed to provide a convincing rationale for the proposed combination of teachings of Soliman and Bauchot, which is the basis for all of the rejections, the rejections are reversed.

DECISION

The Examiner's decision that claims 1-10, 13-28, and 30 are unpatentable under 35 U.S.C. § 103(a) over the applied prior art for the reasons given by the Examiner is reversed.

REVERSED

MAT

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